REMARKS

Reconsideration of the above-identified patent application in view of the amendments above and the remarks following is respectfully requested.

Claims 1-12 are in this case. Claims 1-12 have been rejected under § 102(e). Independent claims 1 and 11 have been amended. New claims 13 and 14 have been added.

The claims before the Examiner are directed toward a system and method to provide feedback to an operator of a device having a delay in the feedback path. The operator is provided with a display device operative to display an image from a camera located on the device and, via a control device such as a joystick, the operator issues commands to the device that can include commands to move the device or to move the camera relative to the device or to zoom the lens of the camera. To prevent problems associated with feedback delay, such as a tendency to oversteer, on the one hand, or to be overly cautious and slow, on the other hand, the present invention displays a predicted image on the operator's display that closely approximates the view that would be expected from the camera if there were no feedback delay.

§ 102(e) Rejections

The Examiner has rejected claims 1-12 under § 102(e) as being anticipated by Iida et al., US Publication No. 2002/0180878 (henceforth, "Iida et al. '878"). The Examiner's rejection is respectfully traversed.

Iida et al. '878 teach a camera control system that presents predictive feedback to an operator via a display. The objective of this predictive feedback, as in the present invention, is to allow the operator to judge the effects of movement commands that the operator has issued before actual image feedback is available from

the camera. The predictive feedback is presented to the operator via markings on scroll bars or meters or similar visual devices, or via frames drawn on the display.

Following is a citation from paragraphs [0077-0079] of Iida et al. '878, describing the display of predictive feedback in the First Embodiment:

> [0077] FIG. 9 and FIG. 10 are views showing examples of screen displayed on the image display section **32** during the display process of the portable phone **3** according to the present invention. An image **40** shown in FIG. 9 is an image which is captured in the condition that an optical operation command is inputted and the driving section **23** of the camera **2** is driving. Scroll bars **400, 410, 420** in FIG. 9 represent respective drivable ranges of panning, tilting and zooming of the driving section **23** of the camera **2**. The drivable range of the driving section **23** in each scroll bar is generated based on the drivable range of the driving section **23** preliminarily stored in the memory **37** of the portable phone **3**.
>
> [0078] Further, black markers **401, 411, 421** on the respective scroll bars represent a pan position, a tilt position and a zoom position when the image **40** is captured, and are calculated based on view position data **102** added to the image data **110** from which the image **40** was generated. *Further, shaded markers **402, 412, 422** respectively show target positions of pan position, tilt position and zoom position of the driving section **23** calculated from the target position data **111**.*
>
> [0079] When the portable phone **3** receives new image data **110**, view position data **102** to be added to the image data **110** is obtained in step **S27** (FIG. 7), and the markers **401, 411, 421** are displayed on the image display section **32** in displaying the new image. *When the user inputs an optical operation command, target position data **111** is newly rewritten in step **S25**, and the new target position is displayed by means of the markers **402, 412, 422**.* (sic, emphasis added)

Following is a further citation from paragraphs [0088-0090] of Iida et al. '878, describing the display of predictive feedback in the Second Embodiment:

> [0088] FIG. 11 and FIG. 12 are views showing examples of screen displayed on the image display section **32** in a display process of the portable phone **3** according to the present embodiment. An image **50** shown in FIG. 11 is an image captured in the condition that an optical operation command is inputted from the operational section **31** and the driving section **23** of the camera **2** is driving. Furthermore, meters **500, 510, 520** represent drivable ranges of panning, tilting and zooming of the driving section **23** of the camera **2**, respectively.
>
> [0089] Furthermore, needles **501, 511, 521** denoted by the black bold lines on the meters respectively show a pan position, a tilt

position and a zoom position at the time of capture of the image **50**, and are calculated on the basis of the view position data **102** added to the image data **110** from which the image **50** is generated. *Further, needles **502**, **512**, **522** denoted by the dotted lines respectively show target positions of the pan position, the tilt position and the zoom position of the driving section **23** on the basis of the target position data **11**.*

[0090] An image **51** shown in FIG. 12 is an image which is captured in the condition that the driving section **23** has completed driving. Further, each meter in FIG. 12 is as same in meaning as that denoted by the same reference numeral in FIG. 11, and needles **503**, **513**, **523** denoted by the black bold lines on the meters respectively show a pan position, a tilt position and a zoom position at the time of capture of the image **51** based on the view position data **102** added to the image data **110** from which the image **51** is generated. (sic, emphasis added)

The following citation from page 7 line 9 through page 8 line2 of the present application makes clear the distinction between the present invention and the First and Second Embodiments of Iida et al. '878:

It should be noted that image **30** is created by *altering image **28** to reflect the predicted view from camera **18** when device **14** is at the second position* and *not by superimposing an arrow or vector* on image **28** to show where the second position is. (emphasis added)

Applicant respectfully contends that it would be clear to one skilled in the art that visual devices such as the markings on scroll bars of the First Embodiment of Iida et al. '878 or the meters of the Second Embodiment of Iida '878 require more interpretation on the part of the operator than a display showing an estimate of the current view from the camera based on a previous view from the camera and modified so as to account for changes in that view that would be caused by movement commands issued up to that time, as taught in the present application.

Following is a citation from paragraphs [0098-0100] of Iida et al. '878, describing the display of predictive feedback in the Third Embodiment:

[0098] Further, based on the target position data, the portable phone **3** *displays the target position as a frame representing a capture*

> *range after driving of the camera 2 (step S308)* to complete the display process.
>
> [0099] FIGS. 14 and 15 are views showing examples of screen displayed on the image display section **32** in the display process of the portable phone **3** in accordance with the present embodiment. A range **6** shown in FIG. 14 represents *the full range of the camera 2*, and an image **60** is the latest image displayed based on the image data **110** for which reception of one frame data has completed. Further, a view frame **600** is a frame representing a view position generated on the basis of the view position data acquired from the image data **110** currently being received (namely, corresponding to a capture range of the image to be displayed next), and *a predictive frame 601 is a frame representing a target position after driving generated on the basis of the target position data (namely, corresponding to a capture range after driving)*.
>
> [0100] As a result of the above, the image processing section **340** can *set the display area of the image display section 32 based on the full range of the camera 2 and display in the display area capture ranges of the camera 2 at the target position and the view position*, making it possible to improve the operability of the user as is the case of the first embodiment. (sic, emphasis added)

Although the above-cited Third Embodiment of Iida et al. '878 does provide a more intuitive form of predictive feedback than the First and Second Embodiments of Iida et al. '878, wherein a frame drawn on the display is operative to show the operator a prediction of the camera view after the motion control commands issued up until the present time have been completed, the image only occupies a fraction of the available display area because the display is formatted to include the full range that can be covered by panning and tilting the camera. As an example, if the camera has a horizontal viewing angle of 90° and the camera can be panned so as to cover 270° horizontally, the camera image will only occupy one third of the width of the display and provide the operator with correspondingly poorer resolution than would be provided by using the full width of the display.

Zooming exacerbates the above-described problem. If the display is to correspond to the total area that can be viewed by the camera by panning, tilting and zooming, then zooming the lens to a telephoto focal length would result in the image

provided by the camera occupying a small frame on the operator's display, with the rest of the display area substantially unused.

Furthermore, such a display is problematic if the camera is mounted on a platform that permits unrestricted rotation, as would be the case where the camera is mounted on a ground vehicle or an aircraft, because there are no absolute limits on the rotation of the camera to define the boundaries of the display.

In a system where the camera is mounted on a moving vehicle it is highly desirable to present the operator with a view that substantially provides the impression of being in the vehicle and looking along the optical axis of the camera. The moving-frame display taught by Iida et al. '878 does not provide this perspective.

A display according to Iida et al. '878 can be useful as a viewfinding device for guiding a camera in a situation where the operator display is not intended as the primary display for the image captured by the camera, as in the case of a film camera or a television camera with a separate display upon which the image from the camera occupies substantially the full area of the separate display. However, Applicant respectfully contends that the above-described drawbacks of the operator display described by Iida et al. '878 render this system significantly less satisfactory than that described by the present invention for applications such as the remote control of ground vehicles and aircraft.

By contrast, the device of the present invention provides the operator with the most up-to-date estimate of the view from the remote camera possible given the time-delay of the communications system. The image presented to the operator remains substantially the same size and on substantially the same portion of the display, making efficient use of the display surface and providing a higher-resolution image to the operator than the Third Embodiment of Iida et al. '878. The operator's perception

is thus substantially equivalent to seeing what is seen by the camera, which is a significant aid in controlling the positioning of the camera and any vehicle upon which the camera may be mounted.

While continuing to traverse the Examiner's rejections, Applicant has, in order to expedite the prosecution, chosen to amend independent claims 1 and 11 in order to clarify and emphasize the crucial distinctions between the present invention and the application of Iida et al. '878 cited by the Examiner. Specifically, claims 1 and 11 have been amended to clarify that the second image, which is a result of an estimate of the image currently seen by the camera, based upon a previous image from the camera and the movement commands that have been issued until this time, and, optionally, filler image data and/or historic image data, when available, is displayed upon substantially the same region of the display upon which the first image had been displayed. This is in contradistinction to the Third Embodiment of Iida et al. '878, in which the displayed image is moved from place to place on the display, corresponding to the direction the camera is expected to be pointing after the movement commands have been executed.

Support for these amendments can be found in the specification. Specifically, support for the second image occupying substantially the same portion of the display as the first image can be found in Figures 1 and 2 and the following citation from page 7 lines 3-7:

> The current predicted view from camera **18** after the movement command is complete, is formed by manipulating image **28**, for example by *moving or scaling or rotating image* ***28***, as appropriate, *such that, the center of an image of a view from camera* ***18*** *at the second position corresponds to the center of predictive display* ***12***. (emphasis added)

Amended independent claims 1 and 11 now feature language which makes it absolutely clear that the present invention provides for a predictive display having features not hinted at or suggested in Iida et al. '878. Applicant believes that the amendment of the claims completely overcomes the Examiner's rejections on § 102(e) grounds.

To further distinguish the present invention Applicant has added claims 13 and 14, which address the use of filler image data, and, more specifically, filler image data that are manipulated in a manner substantially equivalent to the manipulations that are applied to the first image data. This serves to provide the operator with an improved impression of continuity of the displayed images.

Support for these new claims can be found in the specification. Specifically, support for manipulating the filler image data in a manner substantially equivalent to the manipulations applied to the first image data can be found in the following citation from page 8 lines 17-23:

> Filler section **36** is typically a static pattern which is *manipulated in the same way as image 34*, for example, by *translation, rotation or scaling*. Filler section **36** is generally a repetitive pattern such as a grid. Optionally, additional historic image data of the predicted view is used to fill in the filler section of image **34** instead of using a blank filler or a repetitive pattern filler. The historic image data is based on previous images at or close to the second position. (emphasis added)

<u>Amendments to the Specification</u>

No new matter has been added.

In view of the above amendments and remarks it is respectfully submitted that independent claims 1 and 11, and hence dependent claims 2-10 and 12-14 are in condition for allowance. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

Mark M. Friedman
Attorney for Applicant
Registration No. 33,883

Date: July 18, 2007